

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Previously presented): A transmitter comprising:

 a quadrature modulation unit which inputs an in-phase component and a quadrature component of an input modulation signal and performs quadrature modulation;

 a variable gain amplification unit which amplifies an output of the quadrature modulation unit with a predetermined gain being controlled based on a gain control signal; and

 a power amplification unit which performs power amplification of an output of the variable gain amplification unit,

 wherein the power amplification unit has a linear mode for performing power amplification using a linear operation region in an input/output power characteristic and a saturation mode for performing power amplification using a saturation operation region in the input/output power characteristic, and

 wherein, if transmission output power of the power amplifying unit is equal to or greater than a predetermined value, the output level of the variable gain amplification unit is adjusted, the power amplification unit is operated in the saturation mode, and a transmission output control signal amplitude-modulated based on an amplitude component of the input modulation signal is input to an output control input terminal of the power amplification unit for performing polar coordinate modulation; if the transmission output power is less than the predetermined value, the output level of the variable gain amplification unit is adjusted, the power amplification unit is

operated in the linear mode, and a transmission output control signal of a predetermined level responsive to the transmission output power is input to the output control input terminal for performing linear amplification.

Claim 2 (Previously presented): The transmitter according to claim 1, wherein if the transmission output power is at a maximum output level or proximity thereof, the power amplification unit performs the polar coordinate modulation and if the transmission output power is smaller than the maximum output level or proximity thereof, the power amplification unit performs the linear amplification.

Claim 3 (Previously presented): The transmitter according to claim 1, wherein the power amplification unit comprises a power supply terminal used as the output control input terminal, and wherein the transmitter further comprises a power supply driver for increasing the current capacity of the signal of the predetermined level or the signal amplitude-modulated based on the amplitude component of the input modulation signal and supplying power to the power supply terminal as the transmission output control signal.

Claim 4 (Previously presented): The transmitter according to claim 1, wherein the power amplification unit comprises:

a power supply terminal to which fixed power supply is input; and
an amplification circuit bias terminal used as the output control input terminal to which the transmission output control signal is input.

Claim 5 (Previously presented): The transmitter according to claim 1, further comprising a transmission output control signal input section for inputting the transmission output control signal,

wherein the transmission output control signal input section comprises a DA converter for converting a digital signal into an analog signal, and

wherein the DA converter can change an operation clock and has an operation clock switch function for operating with a higher operation clock than that when the linear amplification is performed only when the polar coordinate modulation is performed in the power amplification unit.

Claim 6 (Previously presented): The transmitter according to claim 3,
wherein an input section of the power supply driver comprises an operational amplifier for waveform shaping, and

wherein the operational amplifier can change an operation current and has an operation current switch function for increasing the operation current as compared with that when the linear amplification is performed only when the polar coordinate modulation is performed in the power amplification unit.

Claim 7 (Previously presented): The transmitter according to claim 3, wherein the power supply driver is a liner regulator.

Claim 8 (Previously presented): The transmitter according to claim 3, wherein the power supply driver is a switching regulator.

Claim 9 (Currently amended): ~~The transmitter according to claim 3,~~

A transmitter comprising:

a quadrature modulation unit which inputs an in-phase component and a quadrature component of an input modulation signal and performs quadrature modulation;

a variable gain amplification unit which amplifies an output of the quadrature modulation unit with a predetermined gain being controlled based on a gain control signal; and

a power amplification unit which performs power amplification of an output of the variable gain amplification unit,

wherein the power amplification unit has a linear mode for performing power amplification using a linear operation region in an input/output power characteristic and a saturation mode for performing power amplification using a saturation operation region in the input/output power characteristic,

wherein, if transmission output power of the power amplifying unit is equal to or greater than a predetermined value, the output level of the variable gain amplification unit is adjusted, the power amplification unit is operated in the saturation mode, and a transmission output control signal amplitude-modulated based on an amplitude component of the input modulation signal is input to an output control input terminal of the power amplification unit for performing polar coordinate modulation; if the transmission output power is less than the predetermined value, the output level of the variable gain amplification unit is adjusted, the power amplification unit is operated in the linear mode, and a transmission output control signal of a predetermined level

responsive to the transmission output power is input to the output control input terminal for performing linear amplification,

wherein the power amplification unit comprises a power supply terminal used as the output control input terminal,

wherein the transmitter further comprises a power supply driver for increasing the current capacity of the signal of the predetermined level or the signal amplitude-modulated based on the amplitude component of the input modulation signal and supplying power to the power supply terminal as the transmission output control signal, and

wherein the power supply driver comprises:

an amplitude slice unit which slices the transmission output control signal at stepwise different voltage levels;

a plurality of switching regulators for converting [[the]] power supply voltage into voltages of stepwise different values; and

a switch group for selecting any one of the output voltages of the plurality of switching regulators.

Claim 10 (Previously presented): The transmitter according to claim 1, further comprising:

a demodulation section for demodulating an output of the power amplification unit; and

a control section for adjusting the timing of amplitude modulation when the polar coordinate modulation is performed in the power amplification unit based on information of a demodulation signal provided by the demodulation section.

Claim 11 (Previously presented): A wireless communication apparatus comprising the transmitter as claimed in claim 1.